



PATENT
Docket No.: 15275/8611 (Dobbins 2-1)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Reissue Application No.: 08/833,620)
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Filed: April 7, 1997)
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U.S. Patent No.: 5,043,002)
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Granted: August 27, 1991)
)
Patentees: Michael S. Dobbins)
Robert E. McLay)
)
For: METHOD OF MAKING FUSED SILICA BY)
DECOMPOSING SILOXANES)
)

Examiner:
J. Hoffman

Art Unit:
1731

#29/617
2/7-10-00

REQUEST FOR RECONSIDERATION

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

In response to the January 31, 2000, office action, applicants respectfully request reconsideration.

Of the patent claims, claims 1, 4-7, 10-13, 16-17, 20-23, and 26 are pending, while claims 2-3, 8-9, 14-15, 18-19, and 24-25 are canceled. Added claims 27 and 30 are pending. The status of the pending claims is that claims 12-13, 16, and 22 are allowed and claims 1, 4-7, 10-11, 17, 20-21, 23, 26-27, and 30 are pending.

The May 31, 2000, personal interview between Examiner Hoffman and applicants attorneys Edward Murphy and Michael Goldman is gratefully acknowledged. The substance of that interview is set forth below.

The rejection of claims 7, 11, 17, and 21 under 35 U.S.C. § 103 for obviousness over U.S. Patent No. 3,823,995 to Carpenter ("Carpenter") in view of U.K. Patent Application No. 2,049,641 to Kratel ("Kratel") is respectfully traversed.

Carpenter is directed to a method for making optical waveguides with silicon tetrachloride. There is no disclosure of a polymethylcyclsiloxane.

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Kratel produces a highly dispersed fume silica by flame hydrolysis of silicon compounds in oxygen containing gas. Suitable silicon compounds include organochlorosilanes, hydrogenchlorosilanes, hydrogenorganosilanes, silanols, and siloxanes. As to the siloxanes, disiloxane and hexamethyldisiloxane are mentioned by Kratel. However, there is no disclosure of the claimed polymethylcyclsiloxanes.

For substantially all the reasons submitted in applicants' prior responses, it would not have been obvious to apply Kratel's techniques for making fume silica to Carpenter's procedures for producing optical waveguides. However, even if these references could be properly combined (which they cannot), their combination would not teach the present invention. Since neither Carpenter nor Kratel utilize polymethylcyclsiloxanes, as required by claims 7, 11, 17, and 21, the rejection of these claims over that combination of references must be withdrawn.

The rejection of claims 1, 4-6, 23, 26-27, and 30 under 35 U.S.C. § 103 for obviousness over Japanese Kokai Patent Application No. 138145 to Kawaguchi et. al. ("Kawaguchi") in view of European Patent No. 38,900 to Schwarz et. al. ("Schwarz") is respectfully traversed.

Kawaguchi relates to a method of making a quartz glass element by oxidizing a silane compound or a siloxane compound (e.g., hexamethyldisiloxane). There is no disclosure of a polymethylcyclsiloxane.

Schwarz manufactures pyrogenic silica with siloxanes, such as hexamethyldisiloxane, hexamethylcyclotrisiloxane, and octamethylcyclotetrasiloxane.

For the reasons set forth in applicants' prior responses, applicants submit that one of ordinary skill in the art would not utilize teachings from Schwarz' process of making pyrogenic silica in conjunction with Kawaguchi's procedure for making quartz glass.

Even if a *prima facie* case of obviousness could be established based upon the combination of Schwarz and Kawaguchi (which it cannot), such a *prima facie* case of obviousness would be rebutted by applicants' showing of unexpected results. As demonstrated by the Declaration of Dale R. Powers under 37 C.F.R. § 1.132 ("Powers Declaration"), the results achieved when utilizing a polymethylcyclsiloxane are substantially better than when a linear siloxane is used. More particularly, a series of tests were conducted under similar conditions (including a siloxane volumetric flow rate of 10 cc/minute) to evaluate the production and deposition rates of silica soot produced from vaporized

octamethylcyclotetrasiloxane, hexamethyldisiloxane, and decamethylcyclopentasiloxane (Powers Declaration ¶¶ 4-5). These tests showed that the above siloxanes produced the following amounts and rates of silica soot deposition:

| Siloxane | Si Delivery Rate (Si atoms per minute) | Amount of Silica Soot Deposited (grams) | Rate of Silica Soot Deposited (grams/minute) |
|------------------------------|--|---|--|
| Octamethylcyclotetrasiloxane | 3.62 | 1205 | 3.26 |
| Decamethylcyclopentasiloxane | 3.63 | 1186 | 3.21 |
| Hexamethyldisiloxane | 2.64 | 855 | 2.31 |

401
382
875
3% 875

(Powers Declaration ¶ 6). An attempt was also made to utilize an atomic Si delivery rate of 3.62 grams of Si atoms per minute of hexamethyldisiloxane which was similar to the above atomic Si delivery rates of 3.62 and 3.63 grams of Si atoms per minute of octamethylcyclotetrasiloxane and decamethylcyclopentasiloxane, respectively (Powers Declaration ¶ 7). However, the burner flame became unstable, black carbon-laden soot was generated, and a non-uniformly shaped preform was produced (*Id.*). As a result, this run was terminated (*Id.*). Dr. Powers has extensive and impressive experience in fabricating fused silica glass and optical fibers (Powers Declaration ¶ 3). Based on his expertise in this field, he believes that silica deposition achieved with hexamethyldisiloxane is most fairly compared with silica deposition achieved with octamethylcyclotetrasiloxane and decamethylcyclopentasiloxane when similar volumetric flowrates are utilized for each (Powers Declaration ¶ 8). As the above data clearly demonstrates, the polymethylcyclosiloxanes of the present invention (e.g., octamethylcyclosiloxane and decamethylcyclopentasiloxane) achieve substantially higher levels and rates of soot deposition than linear siloxanes (e.g., hexamethyldisiloxane). Schwarz teaches that hexamethyldisiloxane is preferred over other disclosed alternatives, such as polymethylcyclosiloxanes. Therefore, one would expect hexamethyldisiloxane to achieve better results to the extent, if at all, Schwarz were relevant to making a consolidated glass body (Powers Declaration ¶ 9). However, as shown by the above results, octamethylcyclotetrasiloxane (and decamethylcyclopentasiloxane) achieved substantially higher silica soot deposition rates than hexamethyldisiloxane (*Id.*). In view of Schwarz's disclosure of hexamethyldisiloxane as preferred, the results obtained in the above experiment

are, in Dr. Powers' opinion, highly unexpected (Id.). Such unexpected results rebut any *prima facie* case of obvious based on the combination of Schwarz and Kawaguchi. See In re DeBlauwe, 736 F.2d 699, 222 U.S.P.Q. 191 (Fed.Cir. 1984).

In view of all the foregoing, it is submitted that this case is in condition for allowance and such allowance is earnestly solicited.

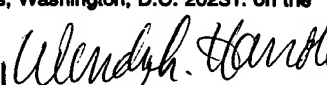
Respectfully submitted,

Date: June 30, 2000



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| 6/30/00 Date |  Wendy L. Harrold |